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Received: 10 Nov 2011  
Revised: 1 Jan 2012  
Accepted: 28 Feb 2012

## Effects of folic acid plus levothyroxine on serum homocysteine level in hypothyroidism

### Abstract

**Background:** Rise in serum homocysteine level may be associated with higher prevalence of cardiovascular diseases in hypothyroidism. Levothyroxine can partly diminish serum homocysteine level. Folic acid participates in homocysteine metabolic cycle in the human body. The effect of concomitant administration of folic acid and levothyroxine on serum homocysteine level was evaluated in the present study.

**Methods:** Sixty patients with hypothyroidism participated in this double-blinded clinical trial study. They were divided into two equal groups; Group A received oral levothyroxine 50-100 µg daily. Group B took oral folic acid 1 mg on a daily basis in addition to levothyroxine with similar schedule to group A. The patients were followed up for two months. The serum homocysteine levels of these two groups were measured before and after the study. This study was registered in Iranian Registry of clinical trial (IRCT number: 201112077723N1).

**Results:** Mean serum homocysteine level fell from  $11.5 \pm 4.2$  to  $9.9 \pm 3.5$  µmol/lit and from  $11.2 \pm 3.1$  to  $6.9 \pm 1.9$  µmol/lit in group A and B, respectively ( $p < 0.001$ ). The mean reduction in serum homocysteine levels were  $1.6 \pm 1.2$  µmol/lit and  $4.3 \pm 1.4$  µmol/lit in group A and B, respectively ( $p < 0.001$ ).

**Conclusion:** Levothyroxine can decrease serum homocysteine level partly; still its combination with folic acid empowers the effect. Combination therapy declines serum homocysteine level more successfully.

**Keywords:** Hypothyroidism, Homocysteine, Folic acid, Levothyroxine

*Caspian J Intern Med* 2012; 3(2): 417-420

Atherosclerosis is a main cause of mortality and morbidity in developed countries. As many studies have shown, atherosclerosis and cardiovascular diseases will stand on top of the list of prevalent diseases in the world until 2020. Prevention of cardiovascular diseases have warranted so many studies to identify their risk factors in different levels (1). The risk of cardiovascular diseases is high in hypothyroidism, too (2). Hypertension and high serum low density lipoprotein (LDL) levels may contribute to this, but they are not seen in all the patients with hypothyroidism (3-5). Moreover, the rise of serum homocysteine level is suggested as an independent risk factor for cardiovascular diseases (6, 7). Homocysteine is an amino acid which is derived from methionin during its metabolism. Folic acid deficiency, administration of folate antagonists such as methotrexate and carbamazepine and disturbance of methionin metabolism after hypothyroidism have been suggested as the reasons of rise in serum homocysteine level (1). Decrease in rate of homocysteine metabolism and diminution of its renal excretion was reported in patients with hypothyroidism (8, 9). It has been reported that treatment with levothyroxine reduces serum homocysteine level (10, 11). With regard to the role of folic acid in homocysteine metabolic cycle as well as low serum folic acid level in patients with hypothyroidism, it seems that the addition of folic acid to levothyroxine may decrease serum homocysteine level more efficiently (11).